



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,453	04/24/2001	Hui-Jung Wu	30-4731 (4780) DIV-1	5324

7590 10/31/2002

Richard S Roberts
P.O. BOX 484
Princeton, NJ 08542-0484

EXAMINER

SARKAR, ASOK K

ART UNIT	PAPER NUMBER
----------	--------------

2829

DATE MAILED: 10/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/841,453

Applicant(s)

WU ET AL.

Examiner

Asok K. Sarkar

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-29 is/are pending in the application.
- 4a) Of the above claim(s) 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I claims 2 - 28 in Paper No. 8 is acknowledged. The traversal was on the ground(s) that the Examiner did not show any distinctness between the two groups. This is not found persuasive because the restriction requirement furnished in Paper No. 7 clearly indicated the separate utility of Group II invention, namely imparting hydrofobicity to concrete structures.

The requirement is still deemed proper and is therefore made FINAL.

Regarding the species restriction, the Examiner is withdrawing the Species restriction, as was done in the case of Paper No. 9 and therefore claims 2 - 28 were rejoined for examination purposes.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2 - 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin, EP 0849,796 in view of Burns, US 5,750,610.

Regarding claim 20, Jin teaches dielectric porous silica xerogel film produced by hydrolysis/condensation of organosilane compounds (see column 4, lines 23 -28) on a substrate (see Figs. 3 and 7b) whereby the silica film is reacted with a surface

modification agent to modify the pore surfaces with HMDS to form a hydrophobic coating on the silica film by reacting silanol groups of the silica film with HMDS in column 4, lines 47 - 52. Reacting under conditions for a sufficient period of time to form the hydrophobic coating is inherent in Jin's method.

Jin fails to expressly teach surface modification agent to comprise one type of oligomer or polymer.

Burns teaches a method of forming silica xerogels by the hydrolysis/condensation of organosilane compounds and hydrophobizing them by treating with low molecular weight organosiloxanes (in column 1, lines 50 - 57 and also in column 6, line 32) in details in column 5, line 40 and column 6, line 2. Oligomers, low molecular weight siloxanes are taught by Burns in column 7, lines 36 - 40 (see polysiloxane in line 40).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Jin's hydrophobizing process by replacing the HMDS with an oligomer or polymer as taught by Burns since Jin's porous silica film (gel) is formed by the same organosilane compound hydrolysis/condensation process as the silica gel formed by Burns. Moreover, replacing Jin's monomer with Burns' oligomer will provide a silica gel with improved hydrophobicity as taught by Burns (column 2, lines 41 - 42).

Regarding claim 2, Burns teaches the presence of solvent during reaction in column 6, line 2.

Regarding claims 3 and 4, Jin and Burns teaches the dielectric film of dielectric constant of 1.3 - 3 (see Jin, column 1, line 27) silica gel which inherently contains pores and silanol groups (Jin, column 4, line 43) and Burns teaches the reaction conditions where the reaction is conducted for sufficient amount of time in column 5, line 40 and column 6, line 2.

Regarding claims 5 and 6, Burns teaches temperature range of 20 – 250°C in column 5, lines 62 – 65 and time of about an hour in column 9, lines 3 – 21.

Regarding claim 7, Burns teaches surface modification agent of an oligomer or polymer capable of reacting with the silanols in column 1, lines 50 – 57.

Regarding claims 8, 11, 14, 18 and 19, Burns teaches polymeric organosiloxanes in column 6, line 32, which are formed by reacting a suitable monomer (e.g. chlorosilane or hexamethylsiloxane) with water in a solvent and is also disclosed in the process of column 9, lines 23 – 40 (see also column 6, lines 40 – 52).

Regarding claims 9 and 10, Burns teaches hydrocarbon as solvent in column 6, line 2.

Regarding claims 12 and 13, Burns teaches the presence of water and organic solvent for the reaction in their reaction process but fails to expressly teach the water to organic cosolvent ratio.

However, it would have been obvious to one with ordinary skill in the art at the time of the invention to judiciously adjust and control these parameters during the hydrophobization process of silica gel film through routine experimentation and optimization to achieve optimum benefits (see MPEP 2144.05).

Regarding claim 15 and 16, Jin teaches surface treatment with a monomeric surface modifying agent and Burns teaches, in addition, surface treatment with a polymeric surface modifying agent that reacts with the silanol groups of the silica gel and it would have been obvious to one with ordinary skill in the art at the time of the invention to apply Jin's process and then modify the process by applying Burns' process.

Regarding claim 17, Burns teaches surface modifying agents of monomer as well as polymer of high molecular weight which cleaves to low molecular weight in column 6, lines 30 – 35 and mixtures of two or more are taught by Burns in column 6, lines 36 – 39.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Jin's method by using a combination of a monomer and a polymer as taught by Burns so that the hydrophobization process is improved.

Regarding claim 21, Jin teaches strong silica dielectric of porous structure (dielectric constant of 1.3 – 3 in column 1, line 27) suitable for drying and polishing in columns 4 and 5, but fails to expressly teach the break strength of 2000 PSI.

However, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Jin's process by applying Burns' process and produce a silica gel structure of break strength above 2000 PSI by controlling the porosity of the gel by proper drying process since strength of a material is controlled by the amount and the size of the pores.

Art. Unit: 2829

4. Claims 22 – 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin, EP 0849,796 in view of Burns, US 5,750,610.

These claims are rejected by applying the same prior art and arguments as were provided above in rejecting claims 2 – 21 since they are not patentably distinct from claims 2 – 21 and is also taught by Jin in column 1, line 6.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 2 – 28 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 - 19 of U.S. Patent No. 6,318,124 in view of Burns, US 5,750, 610. US 6,318,124 teaches dielectric nanoporous silica film on a substrate by forming a coating with an oligomer or polymer of organo siloxanes, but fails to teach that the coating is capable of reacting with the silanol groups as a surface modification agent and render it hydrophobic.

Burns teaches that such organosiloxanes are capable of reacting with the silanol

groups of a porous silica gel and hydrophobize the surface as described earlier in rejecting claims 2 – 28. The hydrophobization process occurs by the reaction of the organic agents with the silanol groups present in the silica gel.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to use Rutherford's process and at the same time automatically hydrophobize the silica surface since the silanol group on the silica film will react with the polysiloxanes to render hydrophobic character to the dielectric film as taught by Burns.

Response to Arguments

7. Applicant's arguments filed September 18, 2002 have been fully considered but they are not persuasive.

8. Applicant argues that Jin only "rinses" with the HMDS, the hydrophobizing agent. This is incorrect. Jin teaches reacting with the surface modification agent to form the hydrophobic coating on the porous silica film because the surface modification agent reacts with the silanol groups of the silica film. Otherwise, the coating will not form.

The arguments on the polarizable groups are spurious. These features do not relate to the teaching of hydrophobizing agent by Jin to form the claimed layer. More importantly, these features are not claimed.

Applicant is also applying piecemeal analysis of references. Burns is not relied on for the teaching of a film. The applicant argues that Burns teaches monomer, which is incorrect. Burns clearly teaches polymeric compounds by the formulas 1 and 2.

Art.Unit: 2829

Higher molecular weight organosiloxanes with a viscosity of a gum is polymeric. Burns also teaches polysiloxanes in column 7, line 40.

1. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the suggestion to modify Jin is to achieve the benefit of a better hydrophobizing process. Jin teaches the exact process and Burns teaches that use of polymers in this process is known.

Therefore, one of ordinary skill in the art would know to use any known material for this purpose to achieve the benefit of an improved and more stable hydrophobic coating of silica gel as taught by Burns. The same arguments can be proscribed also in rejecting claims 22 – 28.

2. The arguments on double patenting are not persuasive because they assert that none of the references teach the reaction with silanol groups on the silica film to form the hydrophobic film. First, Jin teaches reaction of silanol groups with organic siloxanes to form the hydrophobic film on silica gel film. Second, Burns clearly teaches use of polymer to render silica gel hydrophobic. Third, all these hydrophobic surface coatings form because of the reactions between the surface silanol groups and the surface

modifying organosilicon compounds. Without the reaction hydrophobization is not possible.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. This application contains claim 29 drawn to an invention nonelected with traverse in Paper No. 8. A complete reply to the final rejection must include cancelation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 703 308 2521. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703 308 1233. The fax phone numbers

Art Unit: 2829

for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 4918.

Asok K. Sarkar
October 29, 2002



KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800